CLAIMS

1. A micro-electronic mechanical system actuator, comprising:

an actuator stage coupled with a pull-rod.

2. The micro-electronic mechanical system of claim 1, wherein:

the actuator stage includes an arm composed of a first material and a second material, wherein the first material has a coefficient of expansion that is lower than the second material's coefficient of expansion.

3. The micro-electronic mechanical system of claim 2, including an input signal coupled with the arm.

4. The micro-electronic mechanical system of claim 3, wherein:

the first material is stimulated by the input signal such that the first material expands at a greater rate than the second material.

5. A micro-electronic mechanical system actuator, comprising:

a bottom stage, including a plurality of bottom arms, coupled to a top stage, including a plurality of top arms, through a first coupling bar and a second coupling bar.

6. A method for actuating in a micro-electronic mechanical system, comprising:

supporting a first material with a second material;

applying an input signal;

heating the first material such that the first material expands faster than the second material; and

outputting a movement that is along a direction that passes from the first material to the second material.

7. The method for actuating a micro-electronic mechanical system of claim 6, including:

coupling the output movement with a platform such that the platform is moved as a result of the output movement.

8. A micro-electronic mechanical system actuator, comprising:

a top stage including a top arm, wherein:

the top arm is composed of a first material and a second material; and

the first material has a coefficient of expansion that is lower than the second material's coefficient of expansion;

a bottom stage including a bottom arm, wherein:

the bottom arm is composed of a third material and a fourth material; and

the third material has a coefficient of expansion that is lower than the fourth material's coefficient of expansion; and

a pull-rod that couples the top stage with the bottom stage.

9. A micro-electronic mechanical system actuator, comprising:

a top stage including a first top arm and a second top arm, wherein:

the first top arm is composed of a first material with a low coefficient of expansion and a second material with a high coefficient of expansion;

the second top arm is composed of a third material with a low coefficient of expansion and a fourth material with a high coefficient of expansion;

a bottom stage including a first bottom arm and a second bottom arm, wherein:

the first bottom arm is composed of a fifth material with a low coefficient of expansion and a sixth material with a high coefficient of expansion;

the second bottom arm is composed of a seventh material with a low coefficient of expansion and an eighth material with a high coefficient of expansion.

10. The micro-electronic mechanical system actuator of claim 9, including a first coupling bar that couples the top stage with the bottom stage.

11. The micro-electronic mechanical system actuator of claim 10, including: a second coupling bar that couples the top stage with the bottom stage.

12. The micro-electronic mechanical system actuator of claim 11 wherein the top stage moves when the first top arm and the second top arm are stimulated by an input signal such that the first top arm expands at a greater rate than the second top arm.

13. The micro-electronic mechanical system actuator of claim 12 wherein the bottom stage moves when the first bottom arm and the second bottom arm are stimulated by an input signal such that the first bottom arm expands at a greater rate than the second bottom arm.

14. The micro-electronic mechanical system actuator of claim 13 wherein the first and second coupling bars allow the top stage to move with the bottom stage, and the bottom stage to move with the top stage, thereby increasing the range of motion of the top and bottom stages.

15. The micro-electronic mechanical system actuator of claim 14, including a pull-rod coupled with the top stage.

16. A fault tolerant micro-electronic mechanical system actuator, comprising:

a top stage including a first set of top arms and a second set of top arms, wherein:

each top arm from said first set is composed of a first material with a low coefficient of expansion and a second material with a high coefficient of expansion;

each top arm from said second set is composed of a third material with a low

coefficient of expansion and a fourth material with a high coefficient of expansion;

a bottom stage including a first set of bottom arms and a second set of bottom arms, wherein:

each bottom arm from said first set is composed of a fifth material with a low coefficient of expansion and a sixth material with a high coefficient of expansion;

each bottom arm from said second set is composed of a seventh material with a low coefficient of expansion and an eighth material with a high coefficient of expansion.

17. The fault tolerant micro-electronic mechanical system actuator of claim 16 wherein:

one or more of the top arms from the first set and one or more of the top arms from the second set are required to complete a circuit; and

one or more of the bottom arms from the first set and one or more of the bottom arms from the second set are required to complete a circuit.

18. The fault tolerant micro-electronic mechanical system actuator of claim 17, including a first coupling bar that couples the top stage with the bottom stage.

19. The fault tolerant micro-electronic mechanical system actuator of claim 18, including: a second coupling bar that couples the top stage with the bottom stage.

20. The fault tolerant micro-electronic mechanical system actuator of claim 19 wherein the top stage moves when the first set of top arms and the second set of top arms are stimulated by an input signal such that the second material expands at a greater rate than the first material and the fourth material expands at a greater rate than the third material.

21. The fault tolerant micro-electronic mechanical system actuator of claim 20 wherein the bottom stage moves when the first bottom arm and the second bottom arm are stimulated by an input signal such that the sixth material expands at a greater rate than the fifth material and the eighth material expands at a greater rate than the seventh material.

22. The fault tolerant micro-electronic mechanical system actuator of claim 21 wherein the first and second coupling bars allow the top stage to move with the bottom stage, and the bottom stage to move with the top stage, thereby increasing the range of motion of the top and bottom stages.

23. The fault tolerant micro-electronic mechanical system actuator of claim 22, including a pull-rod coupled with the top stage.